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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,013	12/14/2004	Yuji Eguchi	Q85281	1952
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EXAMINER				
TRAN, BINH X				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/518,013

Applicant(s)

EGUCHI ET AL.

Examiner

Binh X. Tran

Art Unit

1792

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-30 is/are pending in the application.
- 4a) Of the above claim(s) 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-26 and 28-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 10-11 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claims 10-11 not been further treated on the merits.
2. Claim 25 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claim 25 not been further treated on the merits.
3. Claims 26, 28-29 are objected to under 37 CFR 1.75(c) as being in improper form because they directly or indirectly depend on claim 25.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claim 30 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 30, the applicants recite "An oxide film forming apparatus according to any of claims 2-5". This preamble is improper and indefinite because claims 2-5 are related to a process.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-7, 10-21, 23-26, 28, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (US 5,593,741) in view of Jain et al (US 6,465,044).

Respect to claim 1, Ikeda teaches a CVD method and an apparatus for forming an oxide film on the surface of the substrate comprising the steps of:

using a raw gas A (i.e. TEOS or TDEAS) and a reactive gas B (i.e. oxygen);
discharged the oxygen gas (i.e. oxygen ions 114 and oxygen radicals 116) of the processing gases (See Fig 1, 17, Fig 3A-3B; col. 6);

joining the processing gas (A) not discharged (i.e. undecomposed TEOS 124) with said process gas B discharged processed in the vicinity of the surface of a substrate to mix them.

Respect to claim 12, Ikeda further discloses an apparatus having a gas supply source for supplying a process gases and a discharged section (See Fig 1, 17 and all paragraph associated with these Figures).

Claims 1 and 12 differ by further disclosing the pressure of 1.0×10^4 to 11×10^4 Pa (75 torr to 825 Torr). Jain teaches to perform atmospheric pressure CVD in the range of 200-600 torr to form silicon oxide (col. 4, col. 6 lines 60, Fig 6)). Jain further discloses in increase in pressure would increase the deposition rate (col. 10 lines 43-50, Fig 6). It would have been obvious to one having ordinary skill in the art, at the time of invention, to perform CVD at atmospheric pressure because it helps to increase deposition rate.

Respect to claim 2 and 13, Ikeda further disclose to use H_2O gas and react discharge oxygen with TEOS (gas A) and water in the vicinity of the substrate surface to mix them (col. 11 lines 25-65; Fig 11, col. 12 lines 1-25, col. 15 lines 55-60).

Respect to claim 3 and 14, Ikeda further discloses applying RF power connect to the electrode (26). When the RF power is applied, at least a portion of the H_2O gas must be discharged along with the discharged oxygen (114, 116). Ikeda further discloses a portion of TEOS gas is not discharged (i.e. undecomposed TEOS 124).

Respect to claims 4 and 15, as discussed above, since the RF power is applied, at least a portion of the TEOS gas (gas A), oxygen (gas B) and H_2O must be discharged. Respect to claims 5 and 16, Ikeda teaches at least a portion the process gas is not discharged (See Fig 3a-3b). Therefore, the examiner interprets at least a portion of H_2O gas is not discharged.

Respect to claims 6 and 17, Ikeda teaches the raw gas A is a silicon containing gas (col. 15 lines 50-54, read on applicant's silicon containing gas or the like). Respect to claims 7, 18, Ikeda discloses to use to use oxidizing gas such as O_2 or N_2O gas (See Fig 1, Fig 16-17).

Respect to claim 10, 25, Ikeda teaches an exhaust mechanism (i.e. vacuum pump section 62 and vacuum pump 64), exhaust control (using control 76) is carried out so that the joined gas forms a gas flow flowing along the surface of the substrate.

Respect to claim 11, Ikeda teaches to each components of the gas having a individual mass flow control (34, 38, 44, 48, 52) and the gas controller 82 to control all the gas flow rate (See Fig 1 and paragraph associated with Figure 1). Since, Ikeda teaches to use the controller to control the flow rate. It would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to have the same flow rate for the gas using the controller.

Respect to claims 17-18, it is noted that claims 17-20 drawn to an apparatus. According to the MPEP 2115, "Material or Article worked upon does not limit the apparatus claims. Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim".

Claims 19-20, 30 further disclose the manner of operating the apparatus. According to MPEP 2114, "Manner of operating the device does not differentiate apparatus claim from the prior art". Further, Ikeda teaches the raw gas A is a silicon containing gas (col. 15 lines 50-54, read on applicant's silicon containing gas or the

like). Ikeda also discloses to use to use oxidizing gas such as O_2 , ozone, or N_2O gas (See Fig 1, Fig 16-17). Further, Ikeda teaches to use TEOS (silicon containing gas) at 50 sccm and ozone-oxygen gas at 1 slm = 1000 sccm (col. 11 lines 40-45). Ikeda also teaches to control the flow rate of individual gas using a mass flow controller (34 and 44). It would have been obvious to one having ordinary skill in the art, at the time of invention to perform routine experiment to obtain optimal weight percentage of process gases or weight ratio of process gases because it has been held that determination of workable range is not considered inventive.

Respect to claim 21, Ikeda further disclose additional gas supply source for supply additional gas (See fig 1, 11, 16, 17). Since claim 21 is an apparatus claim, the examiner does not give any patentable weight regarding the specific gas composition of gas D (See discussion above under MPEP 2114-2115)

Respect to claim 26, Ikeda discloses the exhaust mechanism (vacuum pump 64) is arranged on the side closed to the plasma space on the side at a distance of a flow passage of the joined gas from a place where said reactive gas and raw gas are joined (See Fig 1, 10-11, 16-17). Respect to claim 28, Ikeda teaches to provide a gas flow regulating plate (22) for forming a joining gas flow passage along the surface to be processed (col. 5 lines 6-15, Fig 1, 11, 16-17).

Respect to claims 23-24, Jain discloses a substrate place section for placing the substrate (26) and the discharge processing section are moved relative in both direction using the translation means (32) and the gas emitting ports are arranged in the midst of the substrate carrying course and are arranged forward and backward with respect to

the substrate carrying direction (See Fig 1-2, col. 4 lines 55-65, col. 7 lines 45-67). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Ikeda in view of Jain by moving the substrate in both directions because this allows the deposition time to be controlled (col. 7 lines 60-67).

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda and Jain as applied to claims 1-7, 10-21, 23-26, 28 above, and further in view of Nguyen et al. (US 6,489,255).

Respect to claim 8, Ikeda and Jain fails to disclose supplying a phosphorus-containing gas and/or boron-containing gas. Nguyen teaches to supply a phosphorus containing gas include TMP or TEP, and boron-containing gas include TMB and TEB (See col. 4) in order to provide dopants to the layer. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Ikeda and Jain in view of Nguyen by providing phosphorus-containing gas and/or boron containing gas because it helps to provide dopants to the layer.

10. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda and Jain as applied to claims 1-7, 10-21, 23-26, 28, 30 above, and further in view of Fonash et al. (US 2002/0094388).

Respect to claim 22, Ikeda fails to disclose a specific distance value between the discharged processing section and substrate place section. Fonash teaches the distance between the shower head (i.e. discharge section) and the sample stage was adjustable and set at 2 cm (20 mm; See paragraph 0034). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Ikeda and Jain

in view of Fonash by perform routine experimentation to obtain optimal distance because it has been held determination of workable range is not considered inventive.

11. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda and Jain as applied to claims 1-7, 10-21, 23-26, 28, 30 above, and further in view of Bang et al. (US 6,110,556).

Respect to claim 29, Ikeda teaches to use a porous flow regulating plate (gas dispersion plate 22) and inert gas (helium) is emitted from the gas flow regulating plate (fig 1). However, Ikeda fails to disclose the gas flow regulating plate is ceramic. Bang teaches to use gas dispersion plate made of ceramic because it is capable of withstanding high temperature (col. 5 lines 57 to col. 6 lines 8). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Ikeda and Jain in view of Bang by using ceramic porous gas flow regulating plate because it is capable of withstanding high temperature.

Response to Arguments

12. Applicant's amendment filed on 6-19-20009 in claims 10-11, 25 result in a new ground of objection as discussed above. Claims 26, 28-29 are objected to under 37 CFR 1.75(c) as being in improper form because they directly or indirectly depend on claim 25.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The applicants further states "the CVD methods disclosed in Ikeda and Jain are different, being directed to a plasma-enhanced and non-plasma CVD methods, respectively, and using different organic precursor materials. Therefore, a person of ordinary skill in the art would not perform the process of Ikeda at the pressure disclosed in Jain, and there is no motivation to combine the two references". In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Jain clearly discloses in increase in pressure would increase the deposition rate (col. 10 lines 43-50, Fig 6). The examiner still maintains that it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform CVD at atmospheric pressure because it helps to increase deposition rate.

The applicants further state "Ikeda does not discuss the amount of silicon-containing gas and oxidizing gas used the reaction process". The examiner strongly disagrees with this statement. In col. 11 lines 44-46 or col. 12 lines 54-56, Ikeda clearly

disclose the amount of silicon-containing gas (TEOS or OMCTS) and oxygen-containing gas.

The applicants further state "In contrast, at page 10, lines 8-11, the present specification teaches that the quantity of the process gas (B), i.e., the oxidizing gas equivalent to O₃ of Jain, out of the process gases used in the CVD method is in excess of 50 weight% of the whole process gas". This argument is not commensurate with the scope of the claims. First, there is no limitation in the claim indicating the process gas (B) is O₃. Second, it is noted that there is no limitation in the independent claims 1-5, 12-16 indicating the amount of process gas (B). The dependent claims 19, 30 indicate the amount of process gas (B). However as discussed in previous office action, these claims are drawn to an apparatus (as recited in the preamble of the claim). According to the MPEP 2115 "Material or Article worked upon does not limit the apparatus claims. Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim". According to MPEP 2114, "Manner of operating the device does not differentiate apparatus claim from the prior art". Therefore the amount of process gas (B) in claim 19 and 30 does not limit the apparatus claims or offer no significance in determining patentability of the apparatus claim. Further, Ikeda clearly teaches to control the amount of the process gas using the controller (34, 44).

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571)272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Primary Examiner
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